

# EUROPEAN PATENT OFFICE

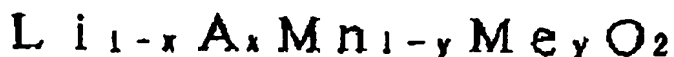
## Patent Abstracts of Japan

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APPLICANT : TOYOTA CENTRAL RES & DEV LAB  
INC;

INVENTOR : SASAKI ITSUKI;



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TITLE : LITHIUM-MANGANESE COMPOSITE  
OXIDE AND LITHIUM SECONDARY  
BATTERY USING IT AS POSITIVE  
ELECTRODE ACTIVE MATERIAL

ABSTRACT : PROBLEM TO BE SOLVED: To stabilize a crystal structure and to improve a cycle characteristic by mixing primary particles having a crystal structure of a regularly arrayed layer-like rock salt structure with primary particles having a spinel-like cubic system crystal structure.

SOLUTION: In order to improve a structure and make better a cycle characteristic, this composite oxide is formed by mixing primary particles each of which is expressed by  $\text{Li}_{1-x}\text{A}_x\text{Mn}_{1-y}\text{Me}_y\text{O}_2$  (A is an alkaline metal: Me is any one, two or more kinds of Ni, Co, Fe, Cu and Al:  $0 < x \leq 0.5$ :  $0 < y \leq 1.2$ ) and has a crystal structure of a regularly arranged layer-like rock salt structure with primary particles each having a spinel-like cubic system crystal structure. In this case, the regularly arrayed layer-like rock salt structure is the same structure as that of  $\text{LiCoO}_2$ , and a lithium-manganese composite oxide having this crystal structure can constitute a secondary battery having large capacity at a low cost when it is used for a positive electrode active material of the lithium secondary battery.

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